State of Rhode Island and Providence Plantations
Water Resources Board
Division of Planning
235 Promenade Street, Suite 230
Providence, RI 02908

Assessment of Drought Conditions June 2020

July 9, 2020

Prepared by Kathleen Crawley, Acting General Manager and Timothy Stagnitta, Programming Services Officer, Rhode Island Water Resources Board

Current State Drought Level: Normal – From the end of May to June 28th most of the state did not receive any significant rainfall, one-month precipitation totals were much below normal for the entire state. Two-month precipitation drought totals have triggered the advisory level for precipitation (<65% of normal) for the Central West (64%) and Eastern (64%) regions, and New Shoreham is at 66% of normal. Streamflow, groundwater, and the Palmer Drought Index are not currently at the advisory level for the state (3 out of 4 major indices must be triggered to set a drought level). The WRB coordinated a staff-level drought expert meeting on July 7th to evaluate drought conditions. The WRB will continue to closely monitor the conditions to determine if the Drought Steering Committee will need to convene.

National Weather Service (NWS) Weather Summary as of July 7th

- Precipitation totals for June averaged 1.50 to 2.50 inches in the state except in northern Providence County where totals averaged 2 to 4 inches. These totals are 60 to 80 percent of normal for June. However, some of the state's drought regions were significantly drier including Central West (35 percent of normal), Eastern (49 percent of normal), and New Shoreham (57 percent of normal). Overall, this is a fairly typical pattern for June, as thunderstorms tend to produce most of the rainfall and are most numerous in the northern third of the state.
- The weather pattern favors above average rainfall through this weekend (7/10-7/12) with as much as 1 to 2 inches of rain possible across Rhode Island Friday and Saturday. A drier weather pattern should return thereafter, before odds once again favor above average rainfall during the last week July.
- Above average temperatures were observed in June throughout all of Rhode Island with departures as much as 2 to 3 degrees above average in the northern third of the state. There is high confidence in seeing above average temperatures through at least the end of July, if not through August and September as well.

Monthly Summary of Conditions (Major Drought Indices)

Precipitation

- June precipitation, across all regions of the state, was below normal (below 100% of normal) for the Northern regions, approaching 65% of normal for the Central East region (68%), and below 65% of normal for the Southern (61%), New Shoreham (57%), Eastern (49%), and the Central West (35%) regions. The cumulative two-month (May-Jun 20) precipitation, across all regions, was below normal and at/near a precipitation advisory for New Shoreham (66%), Eastern (64%), and the Central West regions (64%). The cumulative three-month (Apr-Jun 20) precipitation, across all regions, was at/near normal for the Northern and Central regions, below normal for the Southern (85%) and Eastern (76%) regions and approaching a precipitation watch for New Shoreham (67%). For a full precipitation report, please see the NWS Monthly Water Conditions Monitoring report for June.

Palmer Drought Index (PDI)

- PDI = All RI, Week Ending June 27th = -0.92. The PDI is within the normal range, however a negative PDI indicates that conditions are trending towards a dry phase.
    - PDI includes temperature, potential evapotranspiration, and precipitation data.

Streamflow

- June mean streamflow was below normal (< 25th percentile of normal) for the Central (Pawtuxet Watershed) regions, normal/approaching below normal for the Southern (Pawcatuck Watershed) and Northern (Blackstone Watershed) regions. USGS stream gages in major watersheds in the central region of the state are affected by dam operations, wastewater treatment plant discharges, and water supply diversions. In the Eastern and New Shoreham regions there are no active stream gages.
- The 28-day average streamflow as of July 7th for relatively unregulated stream gages that the WRB monitors for drought conditions are summarized below (see figures for additional information):
    - Pawcatuck River at Wood River Junction remains in the normal range but is approaching below normal.
    - Moshassuck River at Providence was below normal and below the 10th percentile for most of June and recovered to the normal range at the beginning of July.
    - Nooseneck River at Nooseneck has been below normal since mid/late June.
    - Nipmuc River near Harrisville was in the normal range for the month.

Groundwater

- June mean groundwater levels in the Southern and Northern Regions were normal or above normal. Due to the lack of the precipitation in the Central and Eastern regions, WRB staff evaluated the monthly measurements and trend data for wells in those regions. Below is a description of each monitoring well that is measured monthly within the Central and Eastern Regions:
    - Monthly monitoring wells in the Central West Region.
        - COW-466 well located near Maple Valley Rd. in Greene had a GW level below the 10th percentile as of June 30th and the well has been below the 25th percentile for each month since January 2020 (this is a relatively shallow "till" well that could be affected by the well's proximity to the Flat River and Pine Swamp Brook, records date back to 1992).
        - FOW-40 well located near Old Plainfield Pike in Foster had a GW level near the 10th percentile as of June 30th and the May GW level was within the normal range (this is a relatively shallow "till" well with records dating back to 1953).
    - Monthly monitoring wells in the Eastern Region
        - POW-551 well located near East Main Rd. in Portsmouth had a GW level nearing the 25th percentile as of June 23rd and the May GW level was within the normal range (this is a 50ft "till" well with records dating back to 1992 and may be affected by the well's proximity to the Sakonnet River).
        - LTW-142 well located near West Main Rd. in Little Compton had a GW level below the 25th percentile as of June 23rd and the May GW level was approaching the 25th percentile (this is a relatively shallow "till" well with records dating back to 1992 and may be affected by the well's proximity to the Sakonnet River).
- Trends in these wells display declining conditions but do not yet meet the advisory trigger (two months of below normal groundwater levels).

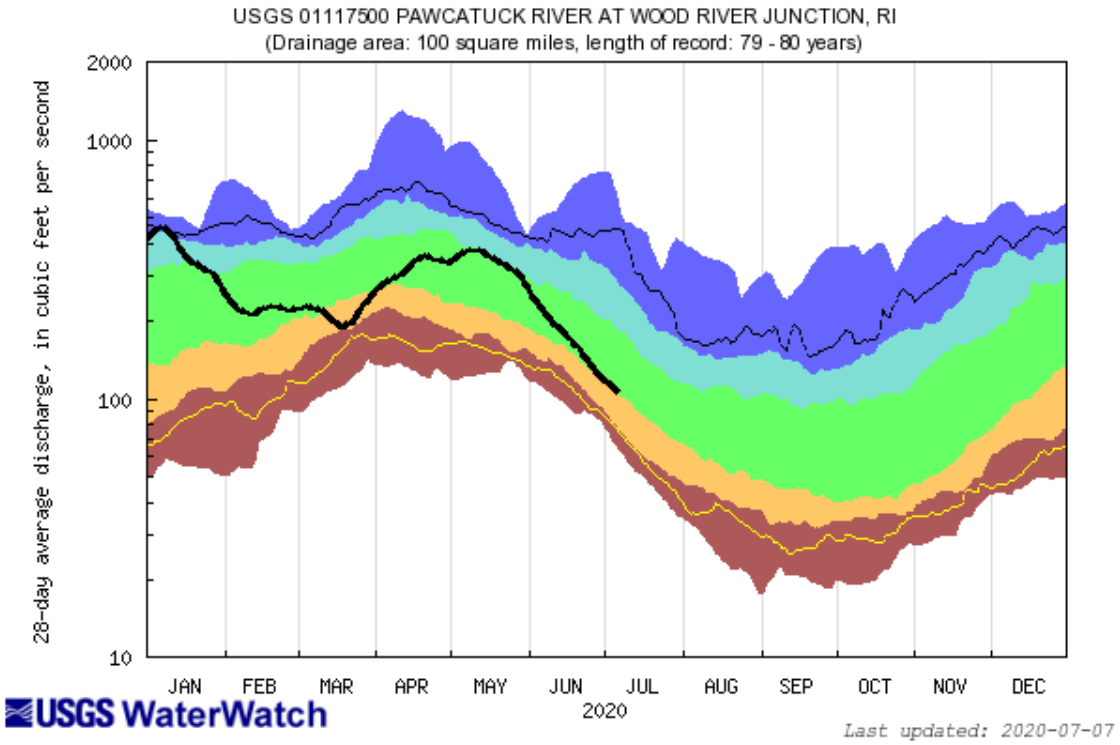
Other Drought Indicators

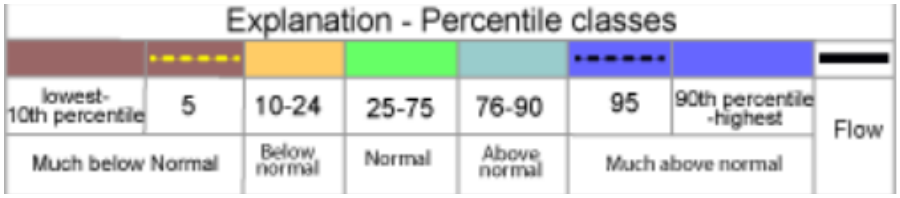
- Crop Moisture Index (CMI) = All RI, Week Ending June 27th = -0.64. The CMI is within the normal range, however a negative CMI indicates that conditions are trending towards a dry phase.
    - The CMI compares soil moisture needs to available water. CMI is a short-term indicator.
- The Scituate Reservoir surface water level as of 7/7/2020 is at an elevation of 282.26 ft (95.9% of capacity). The reservoir level is 2.64ft below the observed level on June 1st (284.9ft). The current reservoir level is available here from the Providence Water Supply Board.
- Standard Precipitation Index (SPI) = The one-month SPI is slightly below normal (< 0) for much of RI, except, for sections of Northern RI. The three-month SPI is slightly below normal for all RI, except, for sections of Northern and Eastern RI. The twelve-month SPI is slightly below normal for all of RI.
    - The SPI compares the current precipitation interval (one-month, three-month, etc.) to all historical months within that interval (example: a weather station with 30 years of data, March 2020 total precipitation is compared with 30 years of March precipitation).
- The weekly U.S. Drought monitor categorized parts of Northern RI as the D0 drought category throughout the month with the rest of RI categorized as the "None" drought category. Current and Historic drought categories from the U.S. Drought Monitor are located here.

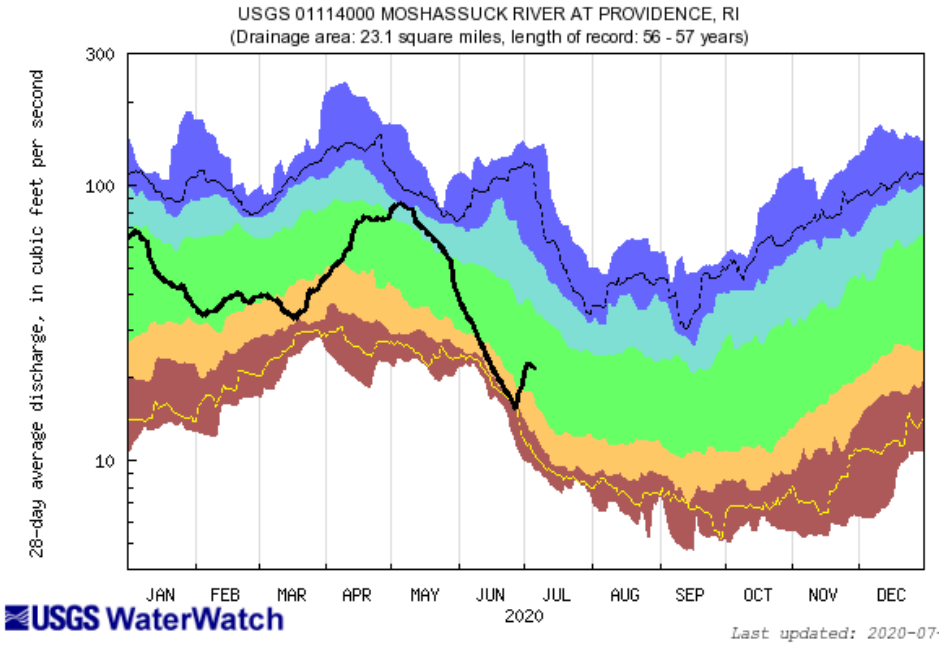
Websites

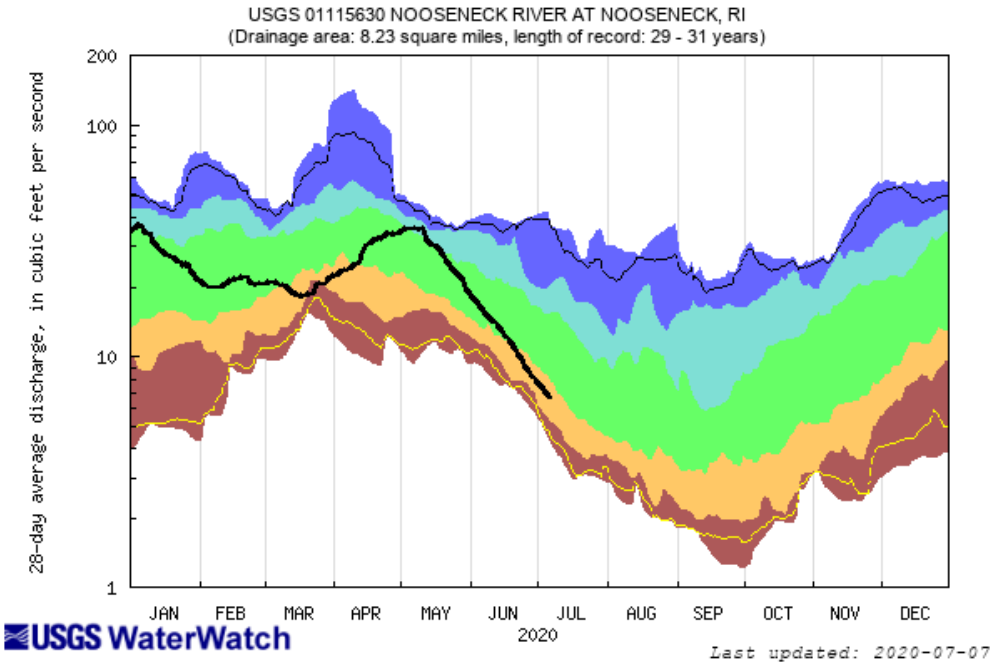
- National Weather Service Monthly Precipitation Reports and RI drought information available within "Monthly Water Conditions Monitoring" section of the WRB Drought webpage.
- USGS Monthly Streamflow and Groundwater Conditions for past three months
    - June 2020, May 2020, and April 2020.
- Northeast Drought Early Warning System (DEWS) Dashboard - http://nedews.nrcc.cornell.edu/
    - Click RI on the map at the top of the Dashboard to see RI specific maps

Figures (28-day average streamflow for selected stream gages)




Explanation - Percentile classes
lowest-10th percentile
5
10-24
25-75
76-90
95
90th percentile -highest
Flow
Much below Normal
Below normal
Normal
Above normal
Much above normal


USGS 01114000 MOSHASSUCK RIVER AT PROVIDENCE, RI
(Drainage area: 23.1 square miles, length of record: 56 - 57 years)
28-day average discharge, in cubic feet per second
300
100
10
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
2020
USGS WaterWatch
Last updated: 2020-07-07


USGS 01115630 NOOSENECK RIVER AT NOOSENECK, RI
(Drainage area: 8.23 square miles, length of record: 29 - 31 years)
28-day average discharge, in cubic feet per second
200
100
10
1
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
2020
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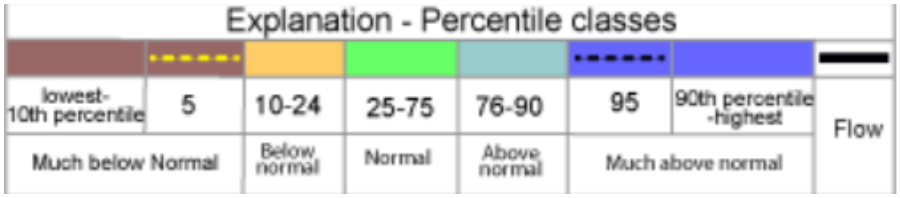
Last updated: 2020-07-07


Explanation - Percentile classes
lowest-10th percentile
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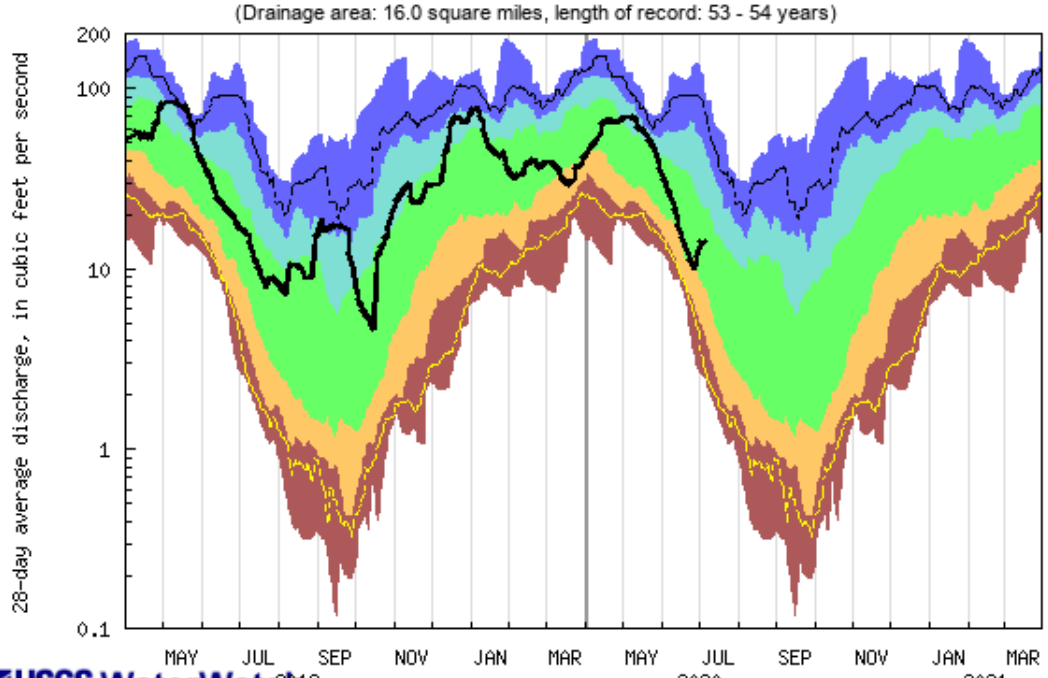
10-24
25-75
76-90
95
90th percentile -highest
Flow
Much below Normal
Below normal
Normal
Above normal
Much above normal

USGS 01111300 NIPMUC RIVER NEAR HARRISVILLE, RI
(Drainage area: 16.0 square miles, length of record: 53 - 54 years)



USGS WaterWatch

Last updated: 2020-07-07

Explanation - Percentile classes

lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		